

DOCUMENT RESUME

ED 125 759

PS 008 656

AUTHOR Carew, Jean V.
TITLE Effective Home Learning Environments in the Preschool Years.
INSTITUTION Harvard Univ., Cambridge, Mass. Graduate School of Education.
SPONS AGENCY Carnegie Corp. of New York, N.Y.; Office of Economic Opportunity, Washington, D.C.
PUB DATE 29 Mar 76
NOTE 26p.; Paper presented at the Conference of the IDHR, University of Florida (Gainesville, Florida, March 29, 1976)

EDRS PRICE MF-\$0.83 HC-\$2.06 Plus Postage.
DESCRIPTORS Age Differences; *Early Experience; *Family Environment; Home Instruction; Infants; *Intellectual Development; Intellectual Experience; *Intelligence; Intelligence Quotient; *Parent Child Relationship; Preschool Children; *Preschool Education

ABSTRACT

A total of 23 children were observed from age 1 to 3 in order to assess day-to-day learning environments and their effect on intellectual development. Observers used a time-sampling technique to code behaviors for one hour on three to five separate occasions during each of four periods: age 12-15 months, 18-21 months, 24-27 months and 30-33 months. Data were coded in terms of the HOME scale, which distinguishes between experiences hypothesized to be intellectually valuable for the child and experiences considered less so, and between the child's behavior and environmental inputs as sources of these intellectually valuable experiences. Four types of experiences were judged to be intellectually valuable. Results indicated a high correlation between experiences hypothesized as intellectually valuable and Binet IQ scores at age 3. Results also showed that the source of intellectual experiences became important at different periods of development, self-motivated experiences becoming more important after age 2 1/2. Also examined was source of experience in relation to observed intellectual competence at age 30-33 months. Here results indicated a strong relationship between competence and intellectual experiences provided by other people. The importance of the role of the interactor (either as entertainer, playmate, or converser) in relationship to the child's later intellectual competence is discussed in detail. (SB)

* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY.

Effective Home Learning Environments in the Preschool Years

Jean V. Carew

Senior Research Associate and Lecturer
Harvard Graduate School of Education
705 Larsen Hall, Appian Way
Cambridge, Massachusetts 02138

This paper was presented at "Update: The First Ten Years of Life" - Conference of the IDHR, University of Florida at Gainesville, March 29, 1976.

The research was supported by the Office of Economic Opportunity, the National Institutes of Health and by the Carnegie Corporation. We owe much thanks to representatives of each of these organizations for their help, encouragement and support.

Effective Home Learning Environments in the Preschool Years

As early as the age of three striking differences in the intellectual and social development of children can already be observed. Some three year olds are alert, curious, highly motivated to learn and highly skilled at creating intellectual stimulation for themselves. They attend carefully to what is going on around them; they eagerly seek out opportunities to learn from others; they clearly enjoy mastering new skills and assimilating new information and often do so on their own without depending on adults to get them started or keep them going. They are pleasant to be with and interesting to interact with, because of their zest, and responsiveness. By contrast, other three year olds seem already apathetic and "turned off". They flit from task to task seldom staying long enough with an activity to really learn from it. Or they cling to adults badgering them for unnecessary attention. Their behavior seems altogether unfocussed and unorganized, or if patterned, it seems guided more by habit than by the intention to master skills or to understand or create. The people around these children find it more strenuous and less rewarding to provide learning experiences for them. Their inattention, their apparent lack of interest in learning, irritate and frustrate all but the most dedicated of parents and teachers. And so a vicious cycle starts, which widening year by year may envelop the child's whole future.

Let us follow these children for a moment into first grade. How will the teacher react to their obvious differences in knowledge, skill, work habits and motivation to learn? Typically, within the first few weeks the teacher will segregate these children into different reading groups, math groups and the like

where they will spend a substantial part of every school day. There they will experience very different teacher expectations, standards, and styles of interaction; there they will be exposed to very different sets of classmates, and there they will use very different materials and move at a very different pace. Once assigned to a given group, the typical child has little chance of moving out of it. His performance in such groups will largely determine his academic record in first grade and this record in turn will be the "objective" evidence on which the second grade teacher will make her decisions about him. And so on, up and out.

In this way, the differences we discerned at age three cast their shadows well into the future and have deep, cumulative, long-lasting consequences. How then did these differences come about in the first place? The answer usually given to this question is that variation in intelligence is controlled partly by genetic and partly by environmental factors and much effort has been spent in estimating precisely how much of the variance is due to each. But of what use are such calculations unless environment and intelligence are meaningfully defined and sensibly assessed in the first place? As psychologists and educators we know that to measure the impact of the environment on the child's intellectual development demands, principally, that we assess the role played by people in bringing about actual learning experiences for the child. It is not enough simply to describe an intervention curriculum as a set of prescriptions or to state a child's SES and thereby imply that a certain "hidden curriculum" operates in his home. As Miller and Dyer's (1975) recent comparison of four pre-school programs shows it is essential to observe the curriculum in action

for some deviation from the prescribed model is the rule rather than the exception. If this is true for teachers implementing well-specified curricula then it is doubly true for parents who are usually not trying to adhere to a specific curriculum at all but only to attain general goals the best they know how.

But how shall we assess the child's day-to-day learning environment and its effect on his intellectual development? A large number of theoretical and practical problems immediately arise. First, we need to agree on how intelligence or intellectual development itself should be defined and measured. Second we need to find out what types of experiences are related to the child's intellectual progress at different periods of his life and in different cultures and settings. And third we need to understand what are effective sources of such experiences and strategies that others can use to help bring them about. Can the environment play an important role in bringing about experiences that promote the child's intellectual growth? Or is the latter promoted primarily by experiences that the child must generate for himself? These are fundamental questions that must be answered by research that leaves the laboratory and seeks to study the effect of complex real life situations on the development of the child.

The main purpose of my talk today is to share with you my attempts to grapple with these questions. Since my purpose is mostly heuristic I shall describe only one of a series of studies that my colleagues and I have carried out on the day-to-day experiences of children in different settings including home, day care, and school. This study focussed on the experiences and environments of a fairly diverse group of one year olds who were observed in the day-to-day

environments of their homes and neighborhoods from age one to three. We began by asking three deceptively simple questions: (1) How were the experiences encountered by the child in those early years related to his later performance on traditional tests of intelligence such as the Binet at age three? (2) If certain types of experiences significantly predicted the child's IQ, what role did the environment and the child himself play in bringing about these experiences? (3) How were the child's IQ and experiences related to his display of intelligent behavior in his everyday activities?

Sample characteristics. The sample consisted of 23 white children who were observed in their own homes and neighborhoods in the Boston area at regular intervals between age one and three.¹ Social class backgrounds, although top-heavy, spanned a fair range (Hollingshead and Redlich classes I to V), and ethnic backgrounds were also fairly heterogeneous.

Observations. Each child was observed as he went about his everyday activities for about one hour on three to five separate occasions during each of four periods: age 12-15 months, 18-21 months, 24-27 months, and 30-33 months. The observer used a time-sampling technique in which she described every other fifteen seconds the child's experiences and later coded the data in terms of a system called the HOME Scale (Carew Watts, Barnett, Halfar and Apfel, 1972). The HOME Scale differs from other coding systems in making two sets of distinctions considered crucial to examining the relationships between environment, experience and intellectual development. The first distinction is between experiences hypothesized to be intellectually valuable for the child and experiences considered to be less so, and the second distinction is between the

child's own behavior and environmental inputs as sources of these intellectually valuable experiences.

Intellectually valuable experiences. Four types of experiences were judged to be intellectually valuable because they seemed to reflect and/or promote the learning of basic skills or content in four traditionally "cognitive" domains: verbal/symbolic, spatial/fine motor, practical reasoning/problem solving, and expressive/artistic. The manifest or inferred topic of the child's experience was the major criterion used in making this judgment. The source of the intellectually valuable experience might be the child's own active "intellectually competent," behavior or an environmental input to which he was attentive. For example, in the first type of experiences -- experiences relevant to verbal and symbolic learning and the acquisition of novel, non-routine information -- the child's own behavior or the environmental input provided evidence that the child was learning to recognize, understand or use labels, grammatical forms, basic symbols such as letters and numbers, and two-dimensional representations of objects and events as in picture books. Typically, the child was engaged in labeling objects, counting, reciting nursery rhymes or children's songs, or "reading" books. Or, he might be attentive to another person or television character who was engaged in such an activity. Similarly, in the third type of intellectual experiences, those labeled "practical reasoning/problem solving", the child's own behavior or the environmental input indicated that he was likely to be learning basic reasoning and problem-solving skills. He might be involved in finding out how mechanisms work or differentiating means from end and cause from effect; or learning about physical principles such as trajectory, equili-

brium, or reflection; or learning about concepts of order, classification and relationship. As in other types of intellectual experiences, the source of the concrete reasoning experience might also be the behavior of another person or television character whom the child observed.

Only a minority of experiences of one and two year olds were judged to be clearly intellectually valuable on the basis of our content criteria. The majority were considered to be of less clear intellectual value, and were coded as simple play-exploration; routine talk; basic care activities; gross motor activities; and so on. Beyond content, the basic process difference between these experiences and those considered to be clearly intellectually valuable concerns the more automatic, routine, unfocussed and unorganized character of the child's or other person's behavior.

Sources of intellectual experience. A crucial distinction made in this research and one which is central to consideration of environmental and genetic effects on intellectual development concerns the sources of the child's intellectually valuable experiences. A specific display of intelligent behavior on the part of the child may be conceived of both as an expression of the child's intelligence (a product of genetic characteristics and past experiences) and as a self-provided opportunity for intellectual stimulation. An observer cannot distinguish between these two aspects, that is between the child's capabilities and his use of these capabilities.² She can however discriminate between primarily self-provided learning opportunities and environmentally provided ones, a distinction that has enormous implications for child-rearing and pedagogy. In this study then a major contrast was made between intellectually valuable exper-

iences that the child generated for himself and similar experiences that were primarily provided for him by others. The source of an intellectual experience was defined as the person or thing supplying the intellectual content of the experience from the observer's standpoint. The child was considered to be the source of the experience if his own behavior was "competent" in the sense of being active, organized, structured and focussed on an intellectual task, so that he might be thought to be providing himself with an intellectual experience through his own intelligent behavior. The environment was the source of the intellectual experience only when the child's behavior was not competent in this sense. The one exception to this rule was the case of true reciprocal interaction where both the child and the interactor contributed "equally" to the child's intellectual experience and were clearly joint sources of its intellectual content.

The main thrust of the data analysis was to compare the relationships with IQ of intellectual experiences occurring in common home situations and derived from these contrasting child and environmental sources.

Results and Discussion

The first question we wanted to answer in this research was whether the experiences that we hypothesized to be "intellectually valuable" for the young child were indeed so, in the sense that they uniquely predicted his IQ at age three. The results, fortunately, were unambiguous. We found that the class of experiences that we had called "intellectually valuable" were, indeed, very highly positively correlated with the Binet whereas all other types of experien-

ces except preparatory, planful activities were uncorrelated or negatively correlated with IQ. Thus, for example, the correlation with IQ for intellectual experiences summed over the four observation periods was .76, whereas for simple, exploratory play it was .2, for routine chit-chat it was -.52, and for social games it was -.56. We can conclude then that everyday activities which seem to an observer to provide clear opportunities for the child to master language, spatial, practical reasoning and expressive skills are indeed the experiences that predict his performance on intelligence tests.³

Does it matter whether the child constructs the intellectually valuable experiences for himself or whether he receives them from his environment? If so, is the question of timing important? The answers to these questions have profound theoretical and pedagogical implications. From Piagetian theory and the philosophy behind the open classroom it might be supposed that the child's active construction of his own experiences is central to his intellectual development, passive learning from the environment being relatively unimportant. In contrast, traditional learning theory and traditional classroom practice assumes that the child progresses intellectually by receiving information, by demonstrations, corrective feedback and reinforcement from the environment. More sophisticated versions of learning theory emphasize the need for structure and appropriateness in environmental inputs and for precisely applied feedback and reinforcement contingencies, but there is not nearly the same stress on the active child fashioning his own knowledge as there is in Piaget's writings (Kohlberg and Mayer, 1972). The Piagetian philosophy is well exemplified by Piaget's claim that to teach a child something is to prevent him from discovering, that

is, truly learning it. Learning theorists and traditional practitioners would find this assertion incomprehensible if not preposterous.⁴

The results of this research give some support to both camps, full comfort to neither. Briefly, we found that it does matter a great deal how the child's intellectual experiences are derived but different sources of intellectually valuable experiences become important at different periods in the child's life. The earliest forms of intellectual experiences that were correlated with test performance at age three (and earlier) were experiences in which the child interactions with another person. These intellectual experiences included reciprocal interaction in which the child and the interactor contributed jointly to the child's intellectual experience, but most important were encounters in which the interactor was the primary source of the intellectual experience and the child the attentive but basically non-contributing partner. It was not until age two and a half that the intellectual experiences that the child fashioned through his own activity began to be significantly correlated with his tested intellectual competence. These conclusions were borne out by more sophisticated multiple regression analyses. Put simply we found that about 55% of the variance in the child's IQ at age three could be attributed to the intellectual stimulation he received from others and only 14% to the intellectual opportunities he was able to provide for himself.

These results may be summarized by saying that there is a definite sequence which places in time certain sources of the child's intellectual experiences before others in promoting the skills and knowledge that are reflected in test performance. Intellectual experiences in which another person plays an active,

structuring, even a dominant part are the ones from which the younger child gains most. It is not until he is two and a half, that the experiences that the child fashions through his own intelligent behavior begin to rival those he receives from his human environment in promoting the competencies that are assessed by tests.

We would be left decidedly uncomfortable if this pattern of relationships with tested intellectual competence were all that the results of our study demonstrated, since an equally important goal of this research was to investigate the experiential antecedents of the child's spontaneous expression of intellectual competence in his everyday life. It does not satisfy us merely to know more about the role played by experience in tested intellectual competence when this assessment, conducted in a contrived situation and employing an arbitrary and restricted range of items, is far from perfectly correlated with the child's display of intellectual competence in his day-to-day activities. A central question for us then was how this spontaneous display of intellectual competence, manifested in a large variety of activities in the natural setting of the child's home, related to environmental factors that impinged on the child's experiences. As was the case for tested intellectual competence, the most compelling way of answering this question is to consider the correlations between the older child's observed intellectual competence and intellectual experiences he receives from different sources at earlier periods in his life.

The results of this analysis astonished us by their simplicity. Briefly, we found that the child's observed intellectual competence at 30-33 months was more highly and stably related to intellectual experiences provided to him by

other people in the preceding year and a half than to intellectual experiences he fashioned for himself. These results duplicated in essential details the findings for tested intellectual competence. In both cases it was the role played by the interactor in creating intellectual experiences for the child or reciprocally sharing in them with him that was first and most highly related to the child's later intellectual competence.

The Interactor as Participator in the Child's Intellectual Experiences

To understand why early interactive intellectual experiences should play so critical a role in the child's intellectual development it is essential to understand how an interactor comes to be judged as a source of the child's intellectual experiences in this research. An interactor is considered to be the primary or joint source of the child's intellectual experiences only when he uses a participatory technique of interaction. The specific techniques defined as participatory include teaching, helping, entertaining, conversing and sharing in the intellectual activity like a playmate. The common feature of these techniques is that the interactor plays a direct, active, and integral role in creating, guiding and expanding the child's intellectual experience. The interactor is responsible either solely or jointly with the child for the manifest intellectual content of the experience. His behavior is not merely facilitative (in the sense, say, of supplying needed materials), or reinforcing (in the sense, say, of praise or approval), or incidental to the intellectual experience. Rather, the interactor's behavior literally creates or helps to create its intellectual content. This content is often judiciously chosen, well structured and attractively presented. But the same or better can be said of certain chil-

dren's television programs, which we found related not at all to intellectual development in these young children. What seems to distinguish these two types of environmental inputs are two features that are highly salient in the interactor's behavior and seldom present in television programs. These are the individualized and responsive quality of the interactor's behavior and its affective subtext.

When an interactor engages in an intellectual activity with a child he typically tailors his input to the individual child's needs. He tries to match its content and style to what he knows of the child's capabilities and interests. He is responsive to questions, problems, inadequacies in the child's understanding. His behavior is geared to the particular not the average child. When this interactor is a parent or teacher who is in intimate contact with the child on a day-to-day basis, the potential power of such individualized treatment hardly needs further commentary.

This point brings us to the affective aspect of interactive experiences. By the very fact of sharing in intellectual experiences with the child the interactor conveys that such experiences are valued and pleasing. It is not necessary that the interactor express approval or affection overtly. The essential message is already transmitted by the sheer fact that the interactor participates positively in the experience. When this interactor is a parent, a sibling or a friend to whom the child is emotionally attached, it seems very likely that the child will come to value and engage in such activities for the simple reason that these are the ones that people he likes prefer. When, for example, the interactor chooses to role play with the child rather than to roughhouse with

him, the child comes to understand what the other person's system of values is, and, trite though it may seem to say it, he will tend to reflect those values in his own self-directed activities.

The Process of Interaction: Some Concrete Examples

It may not be easy for you to visualize from this abstract discussion what the process of intellectual exchange between a skillful interactor and a child actually looks like. The picture that comes to mind most readily is of an adult humorlessly pushing the child to achieve and forcing pre-packaged information on him willy nilly. This picture is entirely incongruous with our observations, but it is not an uncommon reaction to the labels that we have chosen to use in our conceptual system. Therefore let me try now to bring to life the process of intellectual exchange that we call an "intellectually valuable interaction." I shall try to do this by presenting a series of excerpts culled from our actual observations of young children's experiences.⁵

The interactor as teacher. The first two examples depict the interactor as teacher. The first portrays a fairly conventional teacher-pupil relationship, the mother playing the role of transmitter of knowledge and skills. The next excerpt shows a more subtle process at work. Here there is a conceptual problem that clearly seems to challenge the child, and the interactor's teaching skill consists of being able to cue into the child's concerns and to do something that helps him solve his problem through reorganizing his current mode of thinking.

First, the more conventional example.

Mother is arranging some flowers in a large vase. Janie (age 32 months): "Let me take one, Mommy." Mother suggests: "Why don't you smell this?" and puts a carnation to Janie's nose. Janie sniffs, smelling the flower. Mother: "These are carnations. Not much of a smell. And those are chrysanthemums." Janie looks on, solemnly taking it all in.

This conventional, though apparently effective teaching technique, may be contrasted with the following more unusual one.

Father is reading to John, age 33 months, Ezra Keat's story "Goggles". They turn to a picture showing the dog Willy running away with the goggles through a hole in a fence. In the picture the dog's face is half hidden behind the fence. John looks and tells Father: "Doggie face broken." Father explains: "No, it's not broken. It's hiding behind the fence." John looks puzzled. He asks: "Hiding?" Father demonstrates: "See my hand? Now, see it hide when I move it behind the book?" John watches intently. Father continues: "Now, see it come out again. It's not broken. It was hiding." John imitates Father's action several times, passing his hand behind the book and watching it reappear.

The interactor as entertainer. For some adults, especially those with the performer's instinct, the most pleasurable way of participating in intellectual activities with a child is to entertain him. Dramatization of stories, role playing, singing, dancing, strumming a guitar are all ways that novel material, original ideas, as well as skills involving the mastering of set sequences can be delightfully imparted. Consider Nancy's experience:

Nancy (age 30 months) calls to her mother: "Find me. I'm hiding." Mother tells her "all right" and walks over to the closet where Nancy is standing in full view. Mother call out in mock distress: "Oh dear, I can't find my Nancy. I wonder where she's gone. Perhaps she's only gone out to buy some bread and milk, but I didn't hear the door. Oh dear, she's just disappeared." Nancy is chortling with delight. Mother pulls back the clothing and looks in at Nancy. She shakes her head and says: "I guess she isn't here. There is a little girl here but her name is Mary. I still don't know where Nancy has gone." Nancy laughs and hides her eyes (presumably so her mother will not be able to see her). Nancy continues chortling as Mother plays variations on the theme of "Where has Nancy gone".

The interactor as playmate. Closely allied to the interactor's role as entertainer in terms of willingness to do "childish" things is his role as the

child's playmate. Here, however, the interactor is not so much on the stage as on the floor. His role as playmate calls for getting down to the level of the one- to three-year-old and pitching into his childish but intellectually important activity. Here is an excerpt that captures the child-like, reciprocal, playful character of this role performed in the context of activities that are clearly of intellectual value to the child.

Mother and Jamie (13 months) are sitting on the floor. Jamie sees a little wooden pig lying on the floor. He picks it up and hands it to Mother calling, "Piggy, piggy." Mother asks, "Shall we hide the piggy?" Jamie smiles. Mother tells him, "I think your piggy is too big to fit under the cup. I'll get something to hide the piggy under." She shows him that the cup is too small. "See, your piggy sticks out. It can't hide under there." Mother goes to the kitchen and returns with pans for a three-tiered cake. Mother hides the pig under the largest pan and places the others on top in a tower. Jamie smiles and immediately takes down the pans one by one and uncovers the pig. He laughs and Mother claps, "Terrific." Jamie then covers the pig with the pan, but immediately uncovers it and grins. Mother: "Hey, you found the piggy. Hide him again." Jamie covers the toy pig and looks at Mother. Mother asks, "Well, where did that piggy go?" Jamie takes off the pan and giggles. Mother claps, "There he is. Murray for Jamie. Jamie found the piggy."

The interactor as converser. The participatory role that comes most easily to many adults is that of the conversation partner. One can chat to a child while doing the ironing, or eating lunch, or walking to the bus stop. But only certain forms of conversation are thought, in this research, to create an intellectually valuable experience for the child. These include the use of language to teach (e.g. labeling objects or events or by expanding a child's statement into a structurally more complete form); to convey novel information; to make comparisons, contrasts and classes; to explain; to revive past experiences; to anticipate future events; or to evoke a poetic or imaginary world. Many examples of this use of language occur in our observations as in the following excerpt:

Mother and Sonja, age 2, are in the living room where Mother is about to blow up a balloon. Sonja says something to Mother about a circus. Mother tells her: "No, you didn't go to the circus--you

went to the parade." Mother asks: "What did you see?" Sonja thinks a moment and then shouts: "Big girls!" Mother smiles: "Big girls and what else?" Sonja says: "Drums!" and laughs. Mother asks: "What made all the loud noise at the end?" Sonja answers: "Trumpets." Mother tells her: "Yes, and fire engines. Do you remember the fire engines?" Sonja nods: "You hold my ears a little bit." Mother smiles: "Yes, I did, just like this," and puts her hands on Sonja's ears. Sonja laughs.

The interactor blends his roles. I have methodically exemplified the several participatory roles that interactors play in their young children's intellectual experiences and yet have not captured the essence of the part. The fault, we think, lies in compartmentalizing the roles for analytic presentation as if in real life they stood apart from each other. In fact, the most striking feature of the behavior of the effective participator is a remarkable blending of these roles. Go back to any of the excerpts that I have given under the four separate headings and you will find that many roles are combined in a single episode. The skillful participator shifts from one to another blurring the lines of demarcation so much so that the ability to vary one's approach seems the quintessence of the part.

In my writings I have often used a metaphor of the theatre in describing the art of effective participation, and for good reason. Just as the skill of a good actor cannot be reduced to separate, quantifiable components, so too the art of stimulating and sustaining a child's intellectual interests cannot be captured by a formula. In the next excerpt, when we see Matthew's mother play an imaginary badminton match with her son, she is teacher, entertainer, conversation-partner, and playmate all at the same time. Her roles are not blocked out in segments. They are combined and interwoven in a creative whole bound together by the mother's exquisite sense of her son's interests and capabilities.

Matthew (age 26 months) comes into the kitchen holding a child-size badminton racket. Matthew swings the racket. Mother: "Did you get it? Where did it go? Down there?" Matthew: "I got it!"

and runs out of the kitchen after an imaginary shuttlecock. (Apparently, Mother and Matthew have played this game before, since her words are immediately taken as a signal to start the make-believe game.) Matthew swings the racket hitting the imaginary shuttlecock. Mother pretends to toss the "shuttlecock" back to Matthew. They continue, Matthew and Mother taking turns hitting the "shuttlecock".

The game continues, becoming more sophisticated. Matthew seems to be timing his imaginary shots to follow Mother's and looks up at the imaginary "birdie" each time it approaches. Matthew inadvertently drops the racket. Mother: "You lost your racket." Matthew: "Oh, I missed!" (As if dropping the racket really did cause him to miss the imaginary shuttlecock.) Matthew runs to the hallway and retrieves the "birdie". Matthew pretends to serve and Mother to return the serve. Matthew retrieves the imaginary shuttlecock from the hallway. They continue. Matthew calls: "Enough, enough!" ... Matthew: "I want a drink of water." Mother gets a glassful: "Are you thirsty?" as she holds the glass for Matthew to drink.

This excerpt captures as beautifully as any we have seen what I mean by a mother's active participation in her young child's intellectual experiences.

Remember that Matthew is only 26 months old and has probably never seen a badminton match. Think of the imagination and skill it requires of Matthew to synchronize his movements with his mother's, to anticipate the trajectory of the imaginary ball, | to retrieve it when he has miscalculated, to reason that if he dropped his racket during the approach of the ball | then he can't have been able to hit it. Think too of the imagination and skill it requires of Matthew's mother to inspire this performance, making their tournament ever more challenging until, at last, Matthew staggers from the court begging for a glass of water much like a tennis player after a grueling match!

Matthew's experience is profoundly intellectual, his mother's behavior truly educative. She challenges Matthew to perform by performing herself; she inspires him to create wonderful images by creating them herself; she excites and pleases him by being excited and pleased herself. Like an actor at one with his audience, she closes all psychological distance between herself and Matthew. Intellectually and emotionally, they interact.

Concluding Remarks

In this paper I have presented a conceptual framework for the analysis of the everyday experiences of young children and evidence suggesting how the quality of the child's early encounters with significant people in his life may critically affect his later intellectual development. I have tried to convey to you what it is about such experiences that make them intellectually valuable, motivationally powerful and emotionally satisfying both to the child and to those who engage in such experiences with him. For, it seems to me that what our research most seriously lacks is a conceptual framework to guide us in deciding what experiences are truly educative for young children and what strategies of interaction by others are truly educational.

A major reason why we have not developed such a framework is our reliance on IQ test performance as the criterion of intellectual growth and of success of educational programs. Far too often intervention programs measure their success primarily in terms of changes in IQ or other test scores, neglecting to tell their more important story which is how the program changed the quality of human interaction between adults and children and how, in turn, these changes affected the child's display of intellectual and social competence in his everyday life. An intervention program is essentially an attempt to persuade, to motivate, to educate adults with respect to children. There are usually three closely interwoven goals. These are to encourage the adult to observe the child's behavior and to interpret it in the light of some conceptual understanding about how children learn and develop; to encourage the adult to become interested in the child and motivated to help him learn; and to educate the adult in the use

of techniques of interaction that are considered educationally effective.

It is absolutely necessary to document how far each of these goals was realized by each adult change agent in an intervention study if only in order to verify the extent to which the program was in fact implemented. But these so-called "process" variables are far more than just checks on program implementation. They are simultaneously core dependent measures whose variation as a function of initial starting conditions of the program (its theoretical base, its implementation strategies, its prescribed behaviors, the characteristics of participants etc.) are as theoretically and practically valuable to assess as traditional "outcome" variables. In fact, as the research I have described indicates, outcome measures such as IQ scores at age three may be critically affected by maternal behaviors that occur at a considerably earlier phase of the intervention and which are no longer operative or effective at the time of the IQ test (other maternal behaviors are now appropriate). To place so much emphasis on outcome measures is to neglect the process of behavior change on the part of the adult and child which ultimately produces both desired and undesired outcomes. From the standpoint both of theory and of social policy it is this process of change that needs to be analyzed and understood if we wish to move beyond the "cookbook" stage of intervention research.

There is another reason why intervention programs should pay greater attention to process variables rather than to test outcomes especially in research on young children. Many of you are profoundly dissatisfied with traditional IQ tests as measures of the intellectual change your interventions are designed to bring about but continue to use them because "everyone else does" or because

they are allegedly the best predictors of later school achievement. But as recent research suggests (Miller and Dyer, 1975; Palmer, 1976) there may be certain fundamental intellectual skills having to do with the child's curiosity, interest in mastery and problem-solving, learning to learn, creativity and so on which are very poorly tapped by conventional IQ tests but which ultimately may be more predictive of later success in school than early IQs. At present we neither know precisely what these skills are nor do we have good measures of them. But these obstacles are not insuperable. They can be overcome if we give higher priority in our work to understanding how the child expresses his intelligence in his day-to-day behavior in the everyday contexts in which he lives and learns.

The need for a fundamental redefinition of intellectual competence and of measures that are more sensitive to the child's everyday manifestations of intelligent behavior are well illustrated by results of the study I described today. In this study the child's observed intellectual competence at 30-33 months (defined as his tendency to create learning experiences for himself through his own active intelligent behavior) was only moderately correlated with the Binet IQ at 36 months ($r=.57$). Further, certain manifestations of intellectual competence, particularly the child's practical problem-solving activities and his apparent struggles to understand basic scientific concepts such as gravity, reflection, and flotation were even more tenuously related to IQ. These expressions of intellectual competence seemed to have more to do with Piagetian concepts of intellectual development than with the verbal skills and knowledge that are reified as intelligence in the Binet.

I shall end with two illustrations drawn from our observations of one child and her mother in this study and ask you to consider whether these are not examples par excellence of the kind of intelligent child behavior that you would most wish parents and teachers to recognize and encourage. In both examples the child's behavior takes the form of intelligent experimentation in an effort to understand fundamental physical concepts. In the first example the mother seems not to recognize that the child is trying to learn and cuts off her mini-experiment peremptorily. In the second she seems to come much closer to understanding the purpose of the child's behavior and is able to facilitate her intellectual quest by appropriate encouragement and demonstration.

Brenda (age 12 months) pushes her glass of milk away, sliding it along the table top. Suddenly she drops a piece of meat into the glass and it sinks. She startles slightly and then deliberately puts a potato chip in and it floats. She looks puzzled.

Brenda puts her hand deep into the glass and seems to be searching for the piece of meat at the bottom. She lifts the glass toward her, peers into it, then pushes it away. Brenda puts her hand in again and waves her fingers about in the milk several times as if trying to reach the meat. Mother comes in with her sister, Jennifer. Mother, "Pretty good! (referring to the fact that Brenda had eaten some food) Do you want a drink?"

Mother holds the glass of milk for Brenda and she drinks. As Mother begins to take away the glass, Brenda starts to screech. Mother: "Oh, you are naughty today!" and goes to the kitchen leaving the glass on the table. Brenda slides the glass over and drops a chip in, resuming her experiment. Mother returns, removes the glass well out of Brenda's reach, lifts her out of the chair, sits her on the floor, and leaves. Brenda starts screaming and whimpering.

Mother comes in and wipes the table, deliberately ignoring Brenda's tantrum that continues for four more minutes.

* * *

Mother clips a small barrette on Brenda's hair (Brenda is 19 months old). Mother: "You can see it in the mirror." (There is a full-length mirror on the wall a few feet away.) Brenda looks around, puzzled. Mother repeats, "Look in the mirror!" Brenda moves toward the mirror and Mother points to the barrette in her hair, as Brenda looks in the mirror. Mother: "You have to get near to see it," and leads her nearer to the

mirror. Mother: "See your barrette? See it?" Brenda pulls at her hair and at the clip. She still seems puzzled. It seems as if she can't reconcile the feel of the barrette in one location (her hair that her hand is touching), and seeing it in front of her in another position. Mother fixes the barrette in her hair and says, "You are not watching. Look there!" Mother points to the reflection in the mirror, and Brenda stares still pulling at her hair, with a puzzled expression. Mother asks Brenda's one-year-old playmate, Tom, if he wants a barrette, too.

Brenda holds out her hand, gesturing for the can full of barrettes and little ornaments that her Mother has taken down. Mother gives her the can and Brenda takes out a barrette. Brenda takes the barrette to Tom and tries to clip it in his hair. Not knowing how to do this, she simply places it on his hair and it falls. Mother observes, and says, "Here's a nice one to put in his hair." Mother slowly clips one in the boy's hair, demonstrating to Brenda how it works. Brenda looks on. Mother leaves the room. (Brenda continues playing with the barrette, apparently still puzzled about how an object in one place can be reflected in another and still unsure about how the clip works to keep the barrette from falling.)

Intervention programs are designed to change the behavior of children through changing the behavior and understanding of significant people in their lives. I hope you will agree that it is this dual process of behavior change and its delicate and complex interrelationships that are the truest and richest measure of the success of the new learning environments that you, with such care and sensitivity, have sought to fashion.

Footnotes |

¹Fifteen Ss in this sample were included in a study described in White, Watts et al. (1973) in which the present author and collaborators analyzed only the child's interactive experiences with people. Their data were recoded for this study in terms of the HOME Scale which was applied to all of the child's experiences, not just his interactions with people.

²In this paper feminine pronouns are generally used to refer to adults and masculine pronouns to the child to avoid confusion. In the research study mothers were available for observation much more often than fathers but approximately equal numbers of boys and girls were observed as subjects.

³More detailed discussions of results and methodology are given in papers presented to the SRCD and ISSBD (1975).

⁴In some of his writings (e.g. Piaget, 1951) Piaget has referred to the essential role of the social environment in the child's construction of cognitive concepts. But he has given relatively little attention to analyzing it in detail.

⁵Much more detailed descriptions are to be found in Carew, Chan and Halfar (1976) from which these excerpts were taken.

References

- Carew, Jean V. Social class, everyday experience and the growth of intelligence in young children. Paper presented to the International Society for the Study of Behavioural Development, Guildford, England, July 15, 1975.
- Carew, Jean V., Chan, Itty and Halfar, Christine. Observed intellectual competence and tested intelligence: their roots in the young child's transactions with his environment. Paper presented to the Society for Research in Child Development, Denver, Colorado, April 11, 1975.
- Carew, Jean V., Chan, Itty and Halfar, Christine. Observing Intelligence in Young Children: Eight Case Studies. New Jersey: Prentice-Hall, Inc., 1976.
- Hollingshead, A. and Redlich, F. Social Class and Mental Illness. New York: John Wiley & Sons, Inc., 1958.
- Kohlberg, Lawrence and Mayer, Rochelle. Development as the aim of education. Harvard Educational Review, 1972, 42, 449-496.
- Miller, Louise and Dyer, Jean. Four preschool programs: their dimensions and effects. Society for Research in Child Development Monographs, 1975, 40.
- Palmer, Francis H. Has compensatory education failed? Paper presented at "Update: The First Ten Years of Life", Gainesville, Florida, March 30, 1976.
- Piaget, Jean. The Origins of Intelligence in Children, Second Edition. New York: International University Press, 1952.
- White, Burton, Carew Watts, Jean, Barnett, Itty Chan, Kaban, Barbara, Marmor, Janice, and Shapiro, Bernice. Experience and Environment: Major Influences on the Development of the Young Child, Vol. I. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1973.